

# THE EFFECT OF USING ICT

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**THE EFFECT OF USING ICT BASED GRAPHIC ORGANIZER  
ACROSS THE STUDENTS' DIFFERENCE LEVEL OF WRITING ABILITY  
AT ENGLISH DEPARTMENT OF IAIN PALANGKA RAYA**

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**Abstract**

The study is aimed at investigating whether ICT based graphic organizer gives facilitative effect or not across the students' difference level of writing ability. The study belongs to quasi experimental study by applying counterbalance procedure to collect the data. The participants are the 26 students of English department of Palangka Raya State Islamic Institute of 2017/2018 academic year. To test the hypotheses, a one way ANOVA test was applied. The research findings shows that, the data fulfills the normality using Shapiro Wilk test ( $p = 0.420, 0.046, 0.50, \text{ and } 0.638 > 0.05$ ) and homogeneity of variance using Levene's test ( $p = 0.541 > 0.05$ ). It is found that the F value is 45.050, with the significance ( $p = 0.050 > 0.000$ ). Therefore, F table  $4.040 < 45.050 > 3.190$  at the 5% and 1% of significant level ( $Df = 48$ ). It meant that there is a very statistically significant difference on students' writing achievement both for the bright and poor students between the students who write an expository essay using ICT Based graphic organizer and those who write an expository essay without using ICT Based graphic organizer.

**Key Words:** effect, ICT Based Graphic Organizer, writing ability.

**A. Introduction**

In the process of EFL writing, there is a tool to help shape ideas that can be applied. It is called a graphic organizer. A Graphic Organizer (GO) is a graphical representation of text concepts. An instructional tool can help students to organize, structured the information and concepts to relate with the other concepts (Ellis, 2004, p. 3). In my opinion, Graphic organizer is a series of visual charts and tools used to represent and organize a student's knowledge or ideas. Graphic organizer is often used as part of the writing process to help students map out ideas, plots, character details and settings before beginning to write. Graphic organizer can be used to: sequence events, analyze cause and effect, compare and contrast and develop concepts in detail. Graphic organizer has many names including visual maps, mind mapping, and visual organizers. GOs are visual representations, models, or illustrations that depict relationships among the key concepts involved in a lesson, unit, or learning task based on theory of schemata concept while Meyen et al. stated that GOs are "visual displays teachers use to organize information in a manner that makes the information easier to understand and learn" (2006, p. 265). The graphic organizers also give benefits to learning process such as in generating ideas, mapping ideas, motivating the students, and creating a positive learning environment. The study is aimed at investigating whether ICT based graphic organizer gives facilitative effect or not across the students' difference level of writing ability at English Department of IAIN Palangka Raya.

## B. Review of Related Literature

The idea of GO is based on Ausebel's assimilation theory of cognitive learning (Ausebel, 1978, p. 25). According to them, the information is organized by mind in a hierarchical top-down fashion. The cognitive approach to learning seeks to understand how incoming information is processed and structured into memory". Cognitive learning theory is that the memory system, with its short term and long- term sorting and encoding components, guide the learning process. Learning is the best achieved when the information is presented systematically and stored in the student's brain in an organized, meaningful and useable manner (McElroy, 2009, p.76). According to Novak, graphic organizer is used to represent children's conceptual understanding. One of the powerful uses of graphic organizer is not only as a learning tool but also as an evaluation tool, thus encouraging students to use meaningful-mode learning patterns (2008, p. 3).

In Cognitive Theories relating to Graphic Organizers, knowledge gained about how the brain processes information has instrumental in the development of teaching techniques and learning strategies. Several cognitive theories in particular lend support to the use of graphic organizers in helping students process and retain information. Schema theory, dual coding theory, and cognitive load theory provide the basis for explaining the characteristics of graphic organizers that support the learning process. According to schema theory, memory is composed of a network of schemas. A schema is a knowledge structure that accompanies or facilitates a mental process. According to Winn and Snider, all of the definitions of schema theory contain the following characteristics: (1) A schema is an organized structure that exists in memory and combined with other schemas, contains the sum of an individual's knowledge; (2) Schema consists of nodes and links that describe relationships between node pairs; (3) Schema is formed through generalities, not specific information; (4) Schemas are dynamic. As new information is learned, it is assimilated into existing schemas or causes the formation of new schemas; (5) Schema provides contexts for how new experiences are interpreted. How information is interpreted is based on existing schemas (Winn, 1996, p. 115).

According to Dye, "the graphic organizer has its roots in schema theory". When students learn something new, they must be able to retain the information for later use. Our knowledge is stored in a scaffold hierarchy as a way of organizing information (2000, p. 72). Its mean information that fits into a student's existing schema is more easily understood learned and retained than information that does not. Based on those explanations, it can be stated that Graphic organizer is a number of visual charts and used to represent and organize a student's knowledge and to represent their conceptual understanding. The theory underlining Graphic organizer is schema theory.

Some researches on graphic organizer in the area of English teaching and learning for higher education have been conducted. First, Sharrock (2008, p.3) found that the students using the graphic organizer showed an improvement in their creative writing. Second, Tayib (2015, p. 11) found that the graphic organizer model had significantly improved the students' writing ability and had positively impacted their attitudes towards this skill. Third, Delrose (2011, p. 10) investigated the use of graphic organizer for writing. She concluded that graphic organizer could be an effective tool used in the writing process to generate sentences and narratives containing more complex structure of syntax and discourse. fourth, Marjori (2011, p.3) conducted a research on the effectiveness of using technology and graphic organizers to teach the pre-writing process. He found that technology and graphic organizers give facilitative effect to teach the pre-writing process. Fifth, Irawati et.al. (2014) found that the strengths of using sandwich graphic organizer were: (a) students were active in process of teaching and learning, (b) sandwich



graphic organizer helped students in making outlining, (c) by using sandwich graphic organizer can support students to read many articles.

Sixth, Herdi, et.al., (2014) found that graphic organizer strategy had brought a lot of improvement toward the students' writing skill at second year students of English Education Department, Faculty of Education and Teachers Training Lancang Kuning University. The improvement was in terms of content, organization, vocabulary, grammar, and mechanics.

Seventh, Aisyah (2016) found that ICT Based GO gave very significant effect on the students' writing score. She also concluded that most students had high positive response on the implementation of using graphic organizer (95.24%). The students also felt excited with graphic organizer (85.71%). In addition, about 57.14% students felt fun when they wrote using graphic organizer. It could be stated that the area of GO helped the students in generating ideas (47.62%), visualizing ideas (28.57%), building sentences and maintaining grammar. The present study is different from the above studies. The present study focuses on the effects of ICT based graphic organizer in writing essay to the different level of students' writing ability. The study also uses counterbalance procedure and a One Way ANOVA to analyze the data.

### **The Graphic Organizer**

*Graphic organizers* are a series of visual charts and tools used to represent and organize a student's knowledge or ideas. Graphic organizers are often used as part of the writing process to help students map out ideas, plots, character details and settings before beginning to write. Graphic organizers can be used to: sequence events, analyse cause and effect, compare and contrast and develop concepts in detail (Morin, 2014, p.9). In addition, the graphic organizer is a strategy that "embraces a variety as designed to display graphically information with categories related to a central concept". (Johnson in the foreword in Helmlich & Pittleman, 2006, p.v). A graphic organizer is a representation of knowledge structure depicting key ideas and their relationships in an organized pattern (Bromley, Irwin-DeVitis, & Modlo, 2005, p.6). Similar with Holley & Danesreau (2004, p.5), "the graphic organizer is a schematic device which enables students to integrate background knowledge, experience, and new information into a coherent and complete picture". Also, Lewis & Thompson (2001, p.45), mention that graphic organizer contain both verbal information and visual images, thus, the use of graphic organizer is facilitative for learners of various levels and with different needs. And, go use useful in organizing information to make information easier to understand and learn. (Ben David, 2002, p.7). The term of graphic organizer is generalized to include several mapping strategies, such as semantic organizers, semantic maps, concept maps, networking, diagrams, flow charts, and other various schematic design. (Bromley, 2005, p.5). The use of graphic organizer is widespread (Eagan, 1999, p.34) and beneficial for all levels of learning (Alvermann, 2006, Bromley, 2005, Helmlich & Pittman, 2006).

Mayer (2007, p. 9) agreed that concrete graphic organizers can assist students in organizing and making relationships among ideas. This strategy makes the information less vague and ambiguous. It helps students focus on relevant details. As Ellis (2004, p.1) noted it "reduces the cognitive demand on the learner". Thus, the use of graphic organizers increases the likelihood that students will retain the information presented. Ellis, also (2004, p. 1) explained that graphic organizers help students become strategic learners. This is the ultimate goal of teaching. As students learn new concepts and try to make connections, they develop higher order thinking skills. In Science classes, these skills are critical in planning and conducting experiments as well as in investigating issues. Additionally, graphic organizers present content in a combination of

ways-visually, orally and aurally. The use of graphic organizers are advantageous because students are more likely to understand and remember the information that is being taught by separating what is important to know from that which is interesting but may not be important. Also, showing the structure of the information may enhance learning at more complex levels due to a decrease of the demands of processing the information. Finally, other skills such as reading, writing and communication as well as "analytical, critical, and creative thinking skills may improve when students learn to recognize patterns of thinking, construct, and use of graphic organizers" (Ellis, 2004, p.2). A variety of graphic organizer can be effective when used in conjunction with a diversity of teaching styles, teaching a wide array of subjects and when developing literacy and cognitive skills of students. "Universal in nature...these can be used to improve learning and performance of a wide array of students, ranging from those who may be intellectually gifted to those with mild learning problems" (p.3).

Graphic organizers are believed to be predominately important because a good visual illustration can show the key parts of a whole and their relations, thereby allowing a holistic understanding that words alone cannot express (Jiang & Grabe, 2007, p.8). Graphic organizers representing the construction of the text can ease the comprehension and retention of the subject matter reading material. The research by Jiang and Grabe (2007, p.5) concluded that: Graphic organizers have shown to assist in the comprehension and recollection of main ideas for immediate text; being the creator of the graphic organizer also impacts its usefulness in comprehension; graphic post-organizers produced greater effects than pre-reading tasks or graphic advance organizers in general; graphic organizer training combined with summarization training seemed to facilitate better results; and the length of time permitted and educational level of the students were important issues. There are some reasons for using graphic organizers: (1) Tools for critical and creative thinking. Graphic organizers help students focus on what is important (Bromley, DeVitis and Modlo, 2005) because they highlight key concepts and vocabulary, and the relationships among them, thus providing the tools for critical and creative thinking. (2). Tools for organizing information. The human mind organizes and stores information in a series of networks (Ausubel, 1968). Graphic organizers are visual depictions that resemble networks and allow students to add or modify their background knowledge by seeing the connections and contradictions between existing knowledge and new information. (3). Tools for understanding information and relationships. Graphic organizers serve as mental tools (Vygotsky, 1962) to help the students understand and retain important information and relationships. (4) Tools for depicting knowledge and understanding. Graphic organizers provide an optional way of depicting knowledge and understanding (Sorenson, 2001), so it is particularly beneficial for students who have difficulty with expressing relationship among parts of economic concepts in written word. (5) Tools for self-learning. Students who use graphic organizers in the classroom develop their ability to use them independently as study tools for note taking, planning, presentation, and review (Dunston, 2002). In other words, graphic organizers are beneficial to students' learning inside and beyond classrooms.

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### **The Graphic Organizer and Schema Theory**

According to schema theory, "it is best to pre teach the overarching concepts and terms that provide the mental framework for building new knowledge structures". The construction of graphic organizers are pre reading activities that are designed to activate prior knowledge and to demonstrate the connection that exists among the "overarching concepts and terms" to be studied. As Vacca and Vacca underscore, "To make connections effectively, students must have



some familiarity with the concepts in advance of their study of the material" (1999, p.328). Though graphic organizers are constructed in various formats, a common configuration is a tree diagram that represents the hierarchical relationships among concepts in relation to other concepts. However, it is important to note that when an organized spatial display is used to facilitate comprehension, be it a map, diagram, or other type of graphic organizer, the display should be concise, coherent, and coordinated (Mayer, & Tapangco, 2006, p. 64). Utilizing a chalkboard, overhead projector, or chart paper, both students and teacher can cooperatively generate the creation of graphic organizers. This cooperation between students and teacher in the construction of graphic organizers encourages the organization of ideas, words, and concepts, assists in making meaningful patterns and connections, and facilitates comprehension and retention of new text. Bruner (2006, p. 230) emphasizes the critical importance of recognizing relationships and patterns of new concepts and ideas, which assists the learner in making meaningful connections of new information with prior knowledge.

Therefore, a teacher's role in facilitating meaningful reading instruction is crucial in the learning process whereby students are actively involved. Students need opportunities and time to express ideas rather than just respond to teachers' questions during reading instruction. Eagan (1999, p. 641) argues that an outcome of the utilization of graphic organizers is the engagement of student interaction where learning becomes more meaningful. Thus, graphic organizers assist in instruction whereby the teacher is dependent on student participation. As students are engaged in the lesson, learning unfolds and meaningful understanding is fostered. In addition, the use of the graphic organizer validates what the students say in a powerful way in that the teacher not only affirms their participation through verbal acknowledgement, but they are also able to examine their thoughts, ideas, and concepts as they are written on the graphic organizer (Millet, 2000). Consequently, a result of graphic organizer use is that learning is more meaningful while rote instruction is reduced.

### **C. Method and Procedures**

The study belongs to a quasi-experimental study by applying counterbalance procedure to collect the data, and a One Way ANOVA to analysis the data. The participants of the study are the 26 students of the third semester English Education Study Program at Palangka Raya State Islamic Institute 2017/ 2018 academic years. This experiment study attempts to answer three research problems: measuring the effect between the bright students' writing score who use the ICT Based Graphic Organizers and those who do not use it; the poor students' writing score who use the ICT Based Graphic Organizers and those who do not use it; and the bright and poor students' writing score who use the ICT Based Graphic Organizers and those who do not use it. To answer the research problems, the study assigns the subjects to use the ICT Based Graphic Organizers before writing an expository essay. To see the effects of using the ICT Based Graphic Organizers, the subjects are also assigned to write an expository essay without using the ICT Based Graphic Organizers. Here, they are assigned to write expository essay using free writing. Counterbalanced procedure is employed to control the order effect of the two different treatments. Then, the two raters are involved in scoring the students' writing products. Here, the raters are given training before rating the composition in order that they have better understanding on scoring criteria. The students' writing products are scored using the primary trait scoring method on idea development. Then, the normality of the data are tested using Shapiro Wilk Test; and the homogeneity of variance are tested using levene statistics. Those tests are required as the assumption of ANOVA tests. The data of the study are analyzed using a one

way ANOVA test provided by SPSS 16 program. Finally, the interpretation of the result from ANOVA test is done in order to see (1) whether there is a significant difference between writing using the ICT Based Graphic Organizers and without using it on the bright students' writing achievement or not; (2) whether there is a significant difference between writing using the ICT Based Graphic Organizers and without using the ICT Based Graphic Organizers on the poor students' writing achievement or not; and (3) whether there is a significant difference between writing using the ICT Based Graphic Organizers and without using the ICT Based Graphic Organizers on the bright and poor students' writing achievement or not.

## **Procedures**

The steps in collecting, analyzing, and hypothesis testing are as follows. In the earlier step, the subjects selected a topic for expository essay. They are assigned to write expository essay using ICT based graphic organizer and without using ICT based graphic organizer. Then, the subjects' writing both using ICT based graphic organizer and without using ICT based graphic organizer (free writing) is scored by two raters. To analyze the data of writing scores, a One Way ANOVA is employed. A One Way ANOVA is used to examine the difference scores among the bright students who use graphic organizer and those who do not use ICT based graphic organizer in writing an essay and the poor students who use graphic organizer and those who do not use ICT based graphic organizer in writing expository essay. A One Way ANOVA is an inferential statistical test used for experimental designs with more than one independent variable or more than two levels of dependent variable. The next step is to interpret the result of statistical calculation. Lastly, a discussion on the results is made to clarify the findings.

## **D. Research Findings**

### **1 Testing Assumption for ANOVA test**

To answer the research problems, a one way ANOVA is applied. Before testing the statistical hypothesis, the assumption test for a one way ANOVA. There are two assumptions to be tested: normality and homogeneity of variance. To test the normality of data, the Shapiro Wilk test was applied. Based on the output of Shapiro Wilk test, it is found that the significant value (p-value) for each category is ( $p = 0.420, 0.046, 0.50, \text{ and } 0.638 > 0.050$ ). If the significant value is greater than 0.050, it indicates that the data are in the normal distribution. The next step is to test homogeneity of variance by applying Levene's test. It tested whether the variances in scores was the same for each of the four groups. Based on output of homogeneity of variance of Levene's test, it is found that ( $p = 0.541 > 0.05$ ). Since the significant value is greater than 0.050, it indicates that the data are homogenous.

### **Testing Statistical Hypothesis**

To test the statistical hypothesis, there are some steps to be done. First, both data are inserted in the SPSS program on a one way ANOVA test, since there are four variables being compared. Then, the significant level of F empiric is determined. Next, to determine the F empiric, the F value is compared with the critical value or F table at 1% and 5% significant level. If the F value is smaller than F table, the null hypothesis ( $H_0$ ) cannot be rejected and the alternative hypothesis ( $H_a$ ) is rejected. On the contrary, if the F value is higher than F table, the null hypothesis ( $H_0$ ) is rejected and the alternative hypothesis ( $H_a$ ) is accepted. Based on the descriptive output, it is said that the mean score the bright students' writing product using ICT Based graphic organizer is

77.92; the mean score the bright students' writing product without using ICT Based graphic organizer is 68.17; the mean score the poor students' writing product using ICT Based graphic organizer is 62.38; the mean score the poor students' writing product using ICT Based graphic organizer is 52.85. The total mean of the score is 65.48.

### 1. The out put from ANOVA test

The ANOVA table gives both between groups and within groups, sums of squares, degrees of freedom, and the significant value. Here is the result of the Anova Table.

**Table 1 The Anova Table of the Students' Writing Score.**

Writing score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4352.981	3	1450.994	45.050	.000
Within Groups	1546.000	48	32.208		
Total	5898.981	51			

Based on the ANOVA output, it can be seen that the F value is 45.050 together with Sig. 0.000. Since the significant value (0.000) is less than 0.050, it indicates that there is a significant difference somewhere among the mean scores on the dependant variables for the four groups. It means that ICT Based graphic organizer gives significant effect on the writing scores for both the bright and poor students.

### 2. The out put from Multiple Comparisons

The Post- hoc test explains where the difference among the group occurs. In the column labelled Mean Difference, there are asterisks (\*) next to the values listed meaning that the two groups being compared are significantly different from one another at the significant value less than 0.050 level. The Multiple Comparisons Table is explained in Table 2.

**Table 2. The Multiple Comparisons Table of the Students' Writing Score**

Dependent Variable: writingscore

(I) group (J) group			Mean			95% Confidence Interval	
			Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Tukey HSD	1	2	9.154*	2.226	.001	3.23	15.08
		3	15.538*	2.226	.000	9.61	21.46
		4	25.077*	2.226	.000	19.15	31.00
	2	1	-9.154*	2.226	.001	-15.08	-3.23
		3	6.385*	2.226	.030	.46	12.31
		4	15.923*	2.226	.000	10.00	21.85
	3	1	-15.538*	2.226	.000	-21.46	-9.61
		2	-6.385*	2.226	.030	-12.31	-.46
		4	9.538*	2.226	.000	3.61	15.46
	4	1	-25.077*	2.226	.000	-31.00	-19.15
		2	-15.923*	2.226	.000	-21.85	-10.00
		3	-9.538*	2.226	.000	-15.46	-3.61

\*. The mean difference is significant at the 0.05 level.

Based on the out put of Tukey Pos hoc test, it could be concluded that:

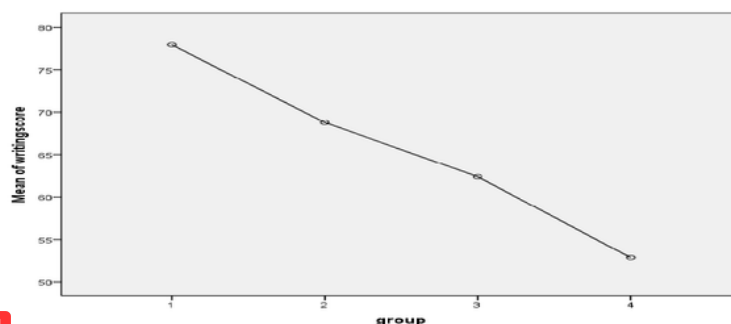
- There was a significant difference between writing using ICT Based graphic organizer and without using ICT Based graphic organizer on the bright students' writing achievement. The mean difference was 9.154 and the significant value was 0.001.



2. There was a significant difference between writing using ICT Based graphic organizer and without using ICT Based graphic organizer on the poor students' writing achievement. The mean difference was 15.538 and the significant value was 0.000.
3. There was a significant difference between writing using ICT Based graphic organizer and without using ICT Based graphic organizer on the bright and poor students' writing achievement. The mean difference was 25.077 and the significant value was 0.000.

### 3. out put from Mean Plots

The mean plot provided an easy way to compare the mean scores for the different group. The Mean Plots of the students' writing score was explained in Figure 1.



**1** Figure 1. The Mean Plots of the Students' writing score

Based on the output of Mean plots, it can be seen that the mean score the bright students' writing product using ICT Based graphic organizer is 77.92 (group 1); the mean score the bright students' writing product without using ICT Based graphic organizer is 68.77 (group 2); the mean score the poor students' writing product using ICT Based graphic organizer is 62.38 (group 3); the mean score the poor students' writing product without using ICT Based graphic organizer is 52.85. ( group 4).

### E. Conclusion

To sum up, a one way ANOVA test is conducted to explore the effect of ICT Based graphic organizer toward students' writing on across the different level of achievement. Based on the output of a one way ANOVA test, it is found that there is a statistically significant difference at the significant value (p- value) was less than 0.05 level in writing scores for the two groups of students ( $F=45.050$ ,  $p= 0.00$ ). Post hoc comparison using the Tukey HSD test indicates that the mean score for group 1 (Mean=77.92, standard deviation= 5.894) is statistically different from group 2 ( Mean=68.77, standard deviation= 4.640); group 3 (Mean=62.38, standard deviation= 5.409); group 4 ( Mean=52.85, standard deviation= 6.581) and the total mean is 65.48, and standard deviation is 10.755. It could be seen that the empiric F value at 45.050 is greater than the F value theoretic. Therefore,  $F_{table} (5\%=4.090) < F_{value} (45.050) > F_{table} ((1\%= 3.190))$ . It meant that the F value empiric at 45.050 is greater than F theoretic at the 5% and 1% of significant level. It means that ICT Based graphic organizer gives a statistically significant difference on students' writing achievement both for the bright and poor students. It means that ICT Based graphic organizer gave facilitative effect on the students' essay writing performance.

This finding is supported by Lewis & Thompson (2001, p.45). They mention that graphic organizer contain both verbal information and visual images. The use of graphic organizer is

facilitative for learners of various levels and with different needs and organizing information to make information easier to understand and learn. Moreover, Ben David (2002, p.7) states that graphic organizer can assist students in organizing and making relationships among ideas. This strategy makes the information less vague and ambiguous. It helps students focus on relevant details. As Ellis (2004, p.1) notes it “reduces the cognitive demand on the learner”. Thus, the use of graphic organizers increases the likelihood that students will retain the information presented. In line with this findings, Ellis, also (2004, p. 1) explained that graphic organizers help students become strategic learners. This is the ultimate goal of teaching. As students learn new concepts and try to make connections, they develop higher order thinking skills.

Here, the use of graphic organizers are advantageous because students are more likely to understand and remember the information that is being taught by separating what is important to know from that which is interesting but may not be important. Finally, other skills such as reading, writing and communication as well as “analytical, critical, and creative thinking skills may improve when students learn to recognize patterns of thinking, construct, and use of graphic organizers” (Ellis, 2004, p.2). This finding is also supported Jiang and Grabe (2007, p.5). They concluded that Graphic organizers had shown to assist in the comprehension and recollection of main ideas for immediate text; being the creator of the graphic organizer also impacts its usefulness in comprehension.

Finally, it was compatible with "schema" theories of cognitive processing advanced by Costa, Ausubel, Neisser and others. Key to this theory of learning was the proposition that in the process of meaningful learning, students construct meanings for concepts and propositions based on experiences, building up their knowledge structure. A clear distinction is made between rote and meaningful learning, here, and the students' prior and existing knowledge is more actively utilised to make sense out of the new knowledge they are learning.

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